the first place, by the green-blue rays; and the red by the yellow and red rays. Potassium, when excited by red light, emitted light of a deep red colour.

These experiments show that at least no very marked deviations from Stokes' law exist.

(4) *Applications to Astrophysics.*—We wish to point out in a few words the importance, for astrophysical problems, of the preceding observations concerning the fluorescence of the metallic vapours.

We know that in the atmosphere of the sun there exist vapours of different metals which are radiated from the sun; these must also exhibit fluorescence, and that of a bright nature. We must also remember that the intensity of the exciting light in the region of the sun is much greater than that near the earth's surface, and also the same may be said of that of the fluorescent light. These rays of fluorescence do not follow Kirchhoff's law.

The radiated fluorescent light is made up of continuous and fluted bands and single lines. By mixing several metals together the continuous bands grouped themselves and formed a continuous spectrum, the delicate, and sometimes less recognisable, fluted bands, however, of several substances neutralised each other, and so became invisible. Each of the sharp lines, on the other hand, remained visible. We have thus, for example, a very simple means of explaining the spectrum of the corona, which consists of a continuous spectrum and single bright lines. It is then unnecessary to assume that luminosity is produced by a continuous agitation depending on electrical oscillations; agitations which, nevertheless, play in many cases an important part. Applications of these results may also be found to be closely related to the theory of the chromosphere, certain forms of prominences, &c.

In all astrophysical and other light phenomena (*Strahlungserscheinungen*) special discussions will be necessary, not only from the point of view as to which portions of the ray are the result alone of an increase in temperature, and which depend on "luminiscence" (*luminescenz*), but it must be especially made clear when we have before us "photo-luminescence" and when "fluorescence." In this case the conditions are relatively simple, and for experiment easily accessible.

(5) *General Remarks.*—The case of the fluorescence of rarefied vapours of potassium and sodium as investigated by us, might be the simplest possible when once the light-producing molecules of the vapourous body under investigation are almost uninfluenced by the action of its neighbours, if we disregard the short spaces of time during which two or more molecules occupy in their respective reactions. Then they behave just like the molecules in bodies of a solid and liquid nature.

Further, the vapours of sodium and potassium consist of single atoms (*einatomig*), so far at least as can be judged from vapour densities established up to the present. The fact, that in these vapours not only band- but also line-spectra make their appearance, necessitates, for the theoretical investigation of fluorescence, the adoption of a new point of departure, more especially if the fundamental movements of the molecules among themselves in fluorescence be investigated.

(6) *Result.*—The fluorescence of sodium and potassium vapours is bright; the former green, the latter red. In the fluorescence spectrum of sodium vapour continuous and fluted bands appear, in addition to the bright sodium line.

Stokes' law is probably valid for the fluorescence of the vapours of metals. The fluorescence of the vapours of metals gives a means of explaining a series of astrophysical phenomena.

(Experiments with helium and argon are in process of investigation.)

NOTES.

M. Chatin has been elected the new Vice-President of the Paris Academy of Sciences, in the place of M. Cornu, who has passed on to the presidency.

The French Government has paid a graceful compliment to Prof. Virchow, by nominating him Commander of the Legion of Honour.

The United States Congress has already made a good beginning as to matters scientific and educational. One of the first subjects to which attention was called, after the opening of the current session, was the proposed joint meeting of the three associations of English-speaking people for the advancement of science, at San Francisco in 1897, namely the Australasian, American and British, following the Toronto meeting of the British Association. A Congressman from Brooklyn presented a memorial and petition from one of the original Fellows of the American Association, setting forth the plan for such a meeting of these associations, and requesting aid from Congress to put the American Association on equal footing with the British in regard to transportation of members across the continent, which it is supposed that the Canadian Pacific Railway will furnish nearly or quite free to the latter. The same member a few days later introduced a resolution in favour of the metric system. Should the three science associations succeed in holding a joint meeting, this subject would well deserve careful consideration.

Two appeals for funds to fit out Polar expeditions have lately been made—one for support of Captain Jackson's scheme for the exploration of the North-East passage, the other for means to equip a British Antarctic expedition. Captain Jackson proposes to determine whether the North-East passage from Europe to China and America is really practicable to merchant vessels properly fitted for the Northern Seas, and to make as many scientific observations as the equipment of his expedition will allow. If he cannot obtain funds to purchase and equip a suitable ship, he announces his intention to proceed to Polar regions in his yacht *Venture*, a boat only thirty-seven feet long. The Honorary Secretary of the Committee that appeals for support on behalf of Captain Jackson's scheme is Mr. E. R. Suffling, Blomfield Lodge, Portsdown Road, London, W.

The Executive Committee for the British Antarctic Committee hope to obtain £5000 to be expended on outfits and supplies for twelve scientific men to spend a year in South Victoria Land. It is proposed that these investigators shall be conveyed to Cape Adair by a commercial expedition now being formed with the object of operating near Victoria Land. The party is expected to leave on September 1 next. After calling at Melbourne they will sail direct to Cape Adair, which, under favourable circumstances, should be reached in about fourteen days. There they will be landed with their outfit and instruments, and remain for one year, after which period they will be called for and brought back by the commercial party. The following is a general plan of the proposed investigations to be carried on at Victoria Land by the scientific members of the expedition: (1) A land party will work towards the South Magnetic Pole, there to make magnetical observations. (2) The coast-line of the open bay will be surveyed, fjords and bays explored and sounded. (3) Zoological, botanical, mineralogical and geological collections will be made. (4) Dredging. (5) Barometrical, thermometrical, meteorological and pendulum observations. (6) Air and water current observations. If this programme is only carried out in part, valuable additions to scientific knowledge will undoubtedly be obtained. There are many who are eager to labour in the unexplored fields of the Antarctic, and already a considerable proportion of the sum required to enable them to do so has been promised. All who are interested in the advancement of Antarctic researches are invited to send subscriptions to the Chairman of the Executive Committee, Royal London Yacht Club, 2 Savile Row, London, W.

MEMBERS of the engineering profession, who believe in the progress of industries through science, will be interested to learn that, according to *Science*, a movement is in progress, in the United States, having for its object the development of a system of mechanical engineering "experiment stations," on much the same basis as the existing agricultural experiment stations. It is anticipated that the outcome will be the organisation of such stations in all the agricultural and mechanical colleges of the country in which the agricultural experiment stations have been successfully organised and operated. The purpose of the movement is to secure the promotion of engineering research, and of the development of the scientific facts and principles which are of most value to the mechanical arts and to the profession of engineering. The headquarters of the central office, to which all will report, is thought likely to be the Bureau of Steam Engineering of the Navy Department; that being the largest, most important, and most generally suitable of the Government Bureaux to take cognisance of such work as is contemplated. A Department of Mechanical Arts was proposed years ago, probably earlier than the Department of Agriculture; but the importance of the former has not been as promptly or as fully recognised as that of the latter, and nothing has yet been done in that direction. Should such a department be founded, it will naturally become the centre of the work of mechanical engineering experiment stations.

A BILL "to establish the University of the United States," was recently introduced simultaneously in the United States Senate and House of Representatives. It provides for the representation at all times of twelve other institutions of the United States in the educational control of the National University. A National University Committee of one hundred has been formed, embracing the Chief Justices of the United States, ten ex-United States senators, certain ex-United States ministers and governors especially interested, the presidents of a number of colleges and universities, the State superintendents of thirty-seven of the States, and the heads of leading national organisations, scientific and patriotic, together with the chiefs of the Government bureaus at Washington. The measure provides for that higher instruction only which follows the work of graduate institutions, and for the induction of students of post-graduate rank into the many fields of original work in research and investigation. The business affairs are to be managed by a board of sixteen regents, with the President of the United States at its head, six members being such *ex officio*, and the remaining nine to be appointed by the President with the consent of the Senate. The educational officers are to be managed by a university council, composed of the regents, acting jointly with twelve eminent educationists representing as many leading institutions of as many States, holding office, like the Regents, for six years, and appointed on the principle that each of the States may in time have representation. The University is authorised to establish such co-operative relations with other institutions as shall be deemed advantageous to the public interests. Neither partisan nor sectarian preferences are to be allowed in any form. Admission is to depend on competency only. The Bill provides for only a few thousand dollars in each of the years 1897 and 1898, to enable the regents to organise, and for the necessary preliminary work.

IT is stated that the New York Pasteur Institute has purchased a farm of about two hundred acres near Tuxedo Park, to be used as an experiment station.

THE storm that visited New York on December 26-27 was attended by the most violent wind ever recorded there. A wind velocity of eighty miles an hour was noted.

MR. JOHN DONNELL SMITH is again in Nicaragua in pursuance of his botanical explorations, which have already been so fertile in additions to the Central American flora.

WE regret to notice the deaths of Prof. Teichmann, formerly Professor of Anatomy and Physiology at Cracow; and of Mr. Hugh Miller, Geologist on the Geological Survey of Scotland, and author of several geological memoirs.

THE vacancy in the Curatorship of the South African Museum, Capetown, caused by the retirement of Mr. Roland Trimen, F.R.S., has been filled by the appointment to that office of Mr. William L. Sclater, Assistant Master of Eton College, and Curator of Eton College Museum. Previously to his present appointment at Eton, Mr. Sclater was for several years Deputy Superintendent of the Indian Museum, Calcutta.

M. R. SCHLECHTER is intending shortly to start on a two years botanical exploration of the South and East of Africa. His programme includes a prolonged stay in Namaland, the Transvaal, Coud-Bockeveld, Limpopo, and Matabeleland as far as the Zambesi. Subscriptions for his collections will be received by Prof. Schumann, Botanical Museum, Grünewaldstrasse, Berlin. They will be at the rate of 35 marks the hundred.

MR. GEORGE W. VANDERBILT is establishing, on his estate at Biltmore, in North Carolina, a scientific collection of dried plants in connection with an arboretum and scientifically managed forest. As a nucleus he has recently purchased, as we learn from the *Botanical Gazette*, Dr. Chapman's herbarium of Southern American plants, which formed the foundation for his "Flora of the Southern States."

THE Fishery Board for Scotland has been reconstituted in accordance with the Sea Fisheries Regulation (Scotland) Act of last Session. Mr. A. Sutherland is reappointed chairman, Mr. R. W. Cochran Patrick is appointed deputy-chairman, Mr. Donald Crawford legal member, and Dr. John Murray scientific member. The other members are Mr. J. R. Welch, Dr. W. R. Duguid, and Mr. A. Jameson.

A REUTER telegram from Stockholm states that, at the instance of the Ministry for Foreign Affairs, notice has been sent to the Governments of Russia, Denmark, Great Britain, and the United States, of S. A. Andrée's projected balloon voyage to the North Pole, and co-operation asked for on behalf of the expedition. Furthermore, the authorities in the countries surrounding the Polar circle will be invited to distribute some thousands of leaflets, containing illustrations of the balloon, and asking for information as to the time at which the balloon is seen, and the direction of the wind at the moment.

ACCORDING to a Reuter telegram from Teheran, there have been two severe earthquakes in Khalkhal, north of Miana. The first occurred during the night of January 2. It was not felt outside the district, but completely destroyed the large village of Zanjabad and partially destroyed several other villages. Three hundred persons lost their lives. The second shock occurred early on the morning of the 5th inst., and was very severe, being felt more than a hundred miles away. The small town of Goi was completely destroyed, 1000 houses being laid in ruins, while great damage was done to many villages. The loss of life in Goi alone amounted to 800 persons. A sharp earthquake disturbance was also felt at Meshad and Kelat at 10.50 on the morning of January 8.

DURING last week an anti-cyclone lay over the British Islands, during which the barometer read higher than had probably been recorded before in this country. The *Daily Weather Report* issued by the Meteorological Office on the 9th inst. showed a barometer reading of 31·09 inches at Ardrossan, in the West of Scotland, and the readings over the whole of the northern and north-western parts of the kingdom reached or exceeded 31 inches. The nearest reading to this occurred in January 1820, again on the 9th, when the barometer in Scotland rose to 31·06 inches; which until now had been considered to be the highest on record in the British Islands. In January 1882, a reading of 30·99 inches was recorded in the South of England.

WE owe the following news to Mr. R. H. Scott, who received it from Caherciveen. "On Monday night, January 6, at about half-past seven o'clock, a large meteor fell from the sky and approached the earth from a north-east direction. As it approached near the earth with accelerated velocity, brilliant sparks or particles were shot out from it in all directions. The whole country was brilliantly illuminated for about ten seconds, that is, during the time occupied by the meteor in its descent. When the meteor was apparently within about two hundred yards of the earth, it burst or exploded, and the increased illumination was most remarkable. It was impossible for a person to estimate, even approximately, the place or neighbourhood where this meteor fell. Different persons, viewing it from various standpoints, give different locations, but they all agree that the descent was westward or seaward of this locality. The meteor was, apparently, of a globular form, with a tail about eight times as long as the diameter of the globular portion. All was of the same brilliant radiance, but a few seconds before the end of the fall, or when the meteor was extinguished, the half of the tail furthest away from the body became black."

THE Swiss National Exhibition begins at Geneva on May 1 and terminates October 15. Mr. Theodore Turrettini, Mayor of Geneva, is president of the exhibition, and it is expected that the electrical exhibit will be remarkably good. Mr. Turrettini has recently completed great engineering works near Geneva, whereby the river Rhone supplies 12,000-horse power, to be electrically transmitted six miles to the grounds. This power makes it possible for elaborate electrical works to be shown. There will be a travelling footpath, operated by electricity, traversing the great machinery hall; horseless cabs driven by electricity, appliances for aerial navigation, a multiplying valve-pump, processes for making paper and fabrics, tests of strength on metals, and many other appliances. Prof. Pictet will exhibit his apparatus for producing intense cold, and will demonstrate the uses of very low temperatures. Numerous other exhibits of scientific interest will be shown.

PROF. W. C. RÖNTGEN, Professor of Physics in Würzburg University, is reported to have discovered that a number of substances which are opaque to visible rays of light, are transparent to certain waves capable of affecting a photographic plate. It is alleged that he has been able to utilise his discovery to photograph metals enclosed in wooden or woollen coverings, and has succeeded in obtaining pictures showing only the bones of living persons, the explanation being that, while wood and flesh freely allow the newly-discovered actinic rays to pass through them, bones and metals are opaque to them. So far as we can gather from the reports, Prof. Röntgen uses as his source of light one of Mr. Crookes' high-vacuum tubes, electrically excited. If this is placed on one side of a box containing a metallic body, or if a hand is held in front of it, and a sensitive plate is arranged on the opposite side, a photograph of the metal, or of the bones of the hand. as the case may be, is obtained. The scientific world will look forward with interest to the publication of the details of Prof. Röntgen's work.

THE old question as to the influence of public libraries in disseminating infection is commented upon by the *British Medical Journal*, in the current issue. It is pointed out that an article in the last number of the *Annales de l'Institut Pasteur*, by Du Cazal and Catrin, is devoted to this question, and it is shown that the leaves of book soiled by streptococcus pus, pneumonic pus, and expectoration, or by diphtherial false membranes, were capable after several days of transmitting these maladies to animals inoculated by bouillon in which pieces of the leaves 1 centimetre square had been soaked. In regard to the question how far it is possible to disinfect books that have become charged with a contagium, these authors show that there are considerable difficulties in the way. Of chemical disinfectants they recommend the vapour of formic aldehyde in which calcium chloride has been dissolved. By means of this they obtained complete disinfection, except in regard to typhoid fever. By exposure to high-pressure steam, however, they got good results—the disinfection was perfect and complete. But in the case of bound books the steam had very destructive effects, the millboard being softened and the cloth wrinkled. Stitched books, however, were uninjured, no harm being done either to the paper, the ink, or even to coloured engravings.

IT speaks well for the extension of interest in science that steamships are advertised to proceed from London with passengers to view the total solar eclipse from Vadsö, in the Varanger Fjord, on August 9. The conditions of 1851, when a small expedition observed a total eclipse from Bue Island, Norway, has given place to a new state of things; and there seems every possibility that for every one who went out to see the obscuration of the sun then, fifty will witness the phenomenon next August. The Orient Steam Navigation Company will send out two of their steamships; Messrs. Cook and Son have made arrangements for special eclipse cruises; and Messrs. Gaze and Son announce a trip to Vadsö in the *Norse King*. This steamer is due at Vadsö on August 3, which leaves sufficient time for the average sightseer to settle down to a frame of mind suitable for observing a solar eclipse. But we notice with some astonishment, in a circular issued by Messrs. Gaze and Son, the statement that "an official party of observers, arranged by a joint committee of the Royal Society and of the Astronomical Society, are proceeding to Norway, and will travel by the s.s. *Norse King*." We can hardly think that this statement is authoritative, for scientific committees are not in the habit of advertising their intention to patronise any particular line of steamers; and, further, astronomers usually require more than five days to adjust and set up their instruments, if any work of real use to science is to be done. Of course, those photographers who merely wish to take snap-shots at the corona do not need to make any elaborate preparations, and if the steamship they travel by carries them into harbour two or three days before August 9, they will have ample time to point their cameras correctly.

IN a short note contributed to the Paris Academy of Sciences on December 30, Prof. Suess calls attention to the striking geographical results of the researches of his Vienna colleagues on the marine Triassic fauna. While to English geologists the Trias is the typical example of an unfossiliferous land-deposit, the work of Mojsisovics on the contemporaneous deposits of the Alpine region has been the starting-point for a series of discoveries in many parts of the world. A rich marine Triassic fauna is now known extending from Spain to Japan and California, and from Spitzbergen to New Zealand. Yet among the thousands of these fossils gathered together in Vienna from all parts, there is not a single marine fossil from the regions bordering the Atlantic or Indian Oceans. The conclusion is obvious, that the regions of these modern oceans were not covered by sea in Triassic times. On the other hand, all the districts bordering the Pacific and Mediterranean yield the marine forms, as does a great stretch of land extending from the Mediterranean to the Pacific through Central Asia, and another extending from the Pacific through Eastern Siberia to the Arctic Ocean. Thus the Pacific Ocean was the main ocean in Triassic times, and stretched out two arms across the continental region—the one called the *Tethyan* ocean, of which the Mediterranean is the last remnant, the other the Arctic branch. This distribution of the Triassic seas strikingly agrees with that of the structural features of modern coast-lines indicated by Neumayr: the oceans bordered by lands with marine Trias are the oceans of the *Pacific type*, of which the coasts are determined by the convex margins of earth-folds; while the oceans of *Atlantic type*, of which the margins cut across the mountain-folds, are those around which only the fresh-water Triassic strata are found. Thus is confirmed the opinion that the latter oceans are of comparatively recent origin, and have been produced by a process of wholesale depression, which has cut out the three great triangular upstanding masses (or *horsts*) of Greenland, Africa, and India, which form so striking a feature on the surface of our planet.

THE Geological Survey has generally been successful with its index maps, and the beautiful hand-coloured index of Wales, on the scale of four miles to an inch, has a great reputation for correctness of topography, clearness and accuracy of colouring, and beauty of appearance. After the lapse of a long period, the Survey, about two years ago, began the issue of an index map of England and Wales on the same scale, and of this several sheets have been already issued. These sheets were also coloured by hand; but on account of their complicated structure they were necessarily very expensive to produce, and hence, although sold with the barest possible margin of profit, or, indeed, with none at all, they could never become very widely used in consequence of their high price. Now, however, an important experiment has been tried, the issue of Sheet 12 printed in colours. This map includes the London Basin and the greater part of the Weald, and it is identical with the hand-coloured sheet; but whereas the price of the latter was 10*s*. 6*d*., that of the former is 2*s*. 6*d*. Printing the map in colours brings with it practically no disadvantage. The topography is clear and correct, the latest railways being inserted; the colours are transparent, clean, harmonious, and well-defined; each colour is lettered at all critical points; the registration is wonderfully exact, although such minute delineation is a very severe test of the workmanship; and the detail is quite as full as on the hand-coloured map, which, it will be remembered, contained many revisions not as yet shown on the original 1-inch sheets. On the other hand, printing in colours has two inestimable advantages, which those familiar with the hand-coloured maps will realise to the full; the inevitable omissions of the colourist will disappear, and, as the colour-proofs come to hand, there is every encouragement for the makers of the map to exercise the minutest care in delineations of details, which, once inserted, cannot again drop out by accidental omissions of the draughtsman, engraver, or colourist. It is to be hoped that this is only the beginning of good things, and that the Survey will persevere until it has the rest of the index similarly printed, thus providing an unequalled and authoritative map of the whole country. If this is successful, we cannot stop here, but must look forward to having reproduced by colour-printing at least such of the 1-inch sheets as are sufficiently used to justify the expenditure. Indeed, it would doubtless be wisest, and really cheapest in the end, to undertake this course with all the sheets of the new series as they come out, irrespective of the demand upon each particular one. If these could be produced at the price of 1*s*., instead of 4*s*., a brisk demand would be at once created. The public must, however, do its share. We have already stated that the index-sheet is issued as an experiment. If the issue is well supported, this will furnish a great encouragement to the Stationery Office to follow the good course it has begun.

A GRAPHIC method of determining the focal lengths of lenses and mirrors is described by Dr. E. H. Barton in the *Philosophical Magazine*. For a concave mirror, cut off the distances of the object and the image respectively on the two axes of Cartesian coordinates, and join the two points. Two separate observations will give two lines intersecting in a point equidistant from the two axes. The coordinates of this point are both equal to the focal length required. The measurements may be controlled by another observation, and the line now obtained should intersect the other two in the same point. A line passing through this point and rotating about it will cut off in succession all the possible values of the conjugate focal distances. For a convex lens, the point is situated in the right hand lower quarter, for a convex mirror in the left-hand lower, and for a concave lens in the left-hand upper quarter of the plane of coordinates.

ON no other frequented trade route are vessels so liable to be obstructed by drift ice as in that portion of the South Atlantic lying to the east of Cape Horn and the Falkland Islands. A chart just issued by the U.S. Hydrographic Office, to show the limits of the enormous ice fields encountered by mariners in those waters, will therefore be of great service. The chart also gives for the months of March, April, and May the isotherms or lines of equal temperature of the surface water. It is stated, however, that these lines are of doubtful value to the navigator in announcing the proximity of ice, as practical experience has shown that the temperature of the surface is little affected thereby. The report of Captain Macmillan, of the ship *Dudhope*, is especially interesting in this connection: "Careful thermometric observations of air and water were regularly taken, but our approach to ice, always from windward, was not once indicated by any appreciable change of temperature, in either air or water. On passing to leeward of the bergs, a fall of a few degrees was generally observed *in the air*. On one occasion we passed within a cable's length of a berg, and found the temperature to be the same there as at several miles' distance. This would go to show that in thick weather—or in any other—even temperature and thermometer at normal height should not be accepted as a trustworthy guarantee of immunity from ice. Care and a most vigilant look-out are the only trustworthy safeguards. To depend on the thermometer would mean disaster, as I am convinced that a ship would be too close to the ice to extricate herself by the time the thermometer would indicate its presence."

RECENT progress in the chlorination process for the extraction of gold from its ores lies mainly in the direction of improvements in the mechanical appliances which are used. The repeated efforts to prevent the oxidising action exercised by chlorine on the unroasted sulphides in ores, by adding salts such as nitre to the mixture, have now apparently been abandoned. Most chemists have always regarded the hopes of the experimenters in this direction as chimerical. Among the mechanical improvements of the last year have been the enlarging of the lead-lined steel barrels used in Western America. As now made, these barrels take a charge of ten tons of ore, instead of only five. The filter inside the barrel is retained, but the expensive asbestos cloth, which lasted for only a few charges, is replaced by a cheap sand-filter, which, it is stated, is not shifted by the rotation of the barrel, and does not become clogged until after it has been used for about 100 charges, or say a month. While the Americans are thus engaged in perfecting the barrel process, the Australians have abandoned it altogether. At the Mount Morgan Mine, where there is the largest chlorination plant in the world, the vats have been reintroduced, but are much enlarged, each having a capacity of twenty-five tons. Chlorine water is used, the consumption of chemicals being less, and the reagent more under control than if gas is pumped into the charge. The use of bleaching powder and sulphuric acid for generating the gas has been superseded again by manganese dioxide, salt and sulphuric acid, and the installation of chlorine stills, towers, and solution tanks. The extraction of gold at Mount Morgan is about 95 per cent. of the total amount in the ore, and the cost of treatment, now about 15*s*. per ton, is expected to be reduced to 12*s*. per ton by the more extended use of revolving furnaces. The total production at the mine is at the rate of over 100,000 ounces of gold per annum. The impetus given to the barrel chlorination process a few years ago seems, from the above facts, to have spent its force.

THE *Bulletin* of the Kansas Experimental Station records instances of the poisoning of cattle by eating the stalks of Indian corn, from the very large amount of potassium nitrate which they contain.

OUR attention has been drawn to two laborious investigations by E. Mazelle, of the Trieste Observatory, recently presented to the Vienna Academy of Science, relating to the daily and yearly range of variability of temperature, and to the relations between the usual mean value and the "most frequent" values of temperature, as deduced from the records of fifty years, 1841-90. The difference between the mean and most frequent values has been discussed by various authorities, notably by Dr. J. Hann in the second edition of his "Climatology." The observations for each month, or year, are grouped so as to show how often a certain value, or interval of temperature occurs, and from these a curve is drawn which differs, according to circumstances, from one showing the mean values, and, while not superseding the latter, is of considerable interest for comparison with it. For various interesting details we refer our readers to the original papers.

THE third edition of M. Faye's "L'Origine du Monde' (Gauthier-Villars, Paris) has lately been published. In this volume M. Faye states and discusses various theories and beliefs held as to the mode of the genesis of worlds, from the Mosaic record to the views of Kant and Laplace, and of their successors. Within the past ten years much work bearing upon the evolution of worlds has been done. Long-exposure photographs of nebulæ have given astronomers more information upon cosmical genesis than all that was known before their era, and photographs of spectra have enabled spectroscopists to arrange celestial objects in order from the youngest to the oldest. We naturally turned to the new edition of M. Faye's book expecting to find the work of recent years set down with the fulness which it deserves. But we were disappointed. Instead of a picture of Dr. Roberts' photograph of the Andromeda nebula, there appears a venerable cliche which ought to be banished from every book that pretends to represent astronomical knowledge of to-day. The same remark applies to the picture and the spectrum of the Orion nebula, of the spectrum of Sirius, and to most of those in the volume. When the first edition of the book appeared, such illustrations might have passed muster; but in these days of abundant photographs and cheap process-blocks, there is no excuse for offending the sight with them. We cannot see any difference between the third edition of M. Faye's book and the first edition, as regards illustration, and little difference as regards the text.

THE additions to the Zoological Society's Gardens during the past week include a Persian Gazelle (*Gazella subgutterosa*, ♂) from Persia, presented by Mr. F. Greswolde-Williams; two Polecats (*Mustela putorius*, ♂ ♀), British, presented by Mr. A. H. Cocks; a Yellow-fronted Amazon (*Chrysotis ochrocephala*) from Guiana, presented by Lieut.-General Arthur Lyttleton-Annesley; two West African Love-Birds (*Agapornis pullaria*) from West Africa, presented by Mrs. Otto Fell; a Crowned Duyker-Bok (*Cephalophus coronatus*, ♀) from West Africa, two King Penguins (*Aptenodytes pennanti*) from the Macquari Islands, purchased.

ERRATUM.—In the article on "The Habits of the Cuckoo" (p. 176), for Dr. Reh read Dr. Rey.

OUR ASTRONOMICAL COLUMN.

HIND'S VARIABLE NEBULA.—Further confirmation of the variability of the nebula N.G.C. 1555, discovered by Dr. Hind in 1852, has been obtained by Prof. Barnard (*Monthly Notices*, vol. lvi. p. 66). It may be remembered that so recently as February 1895, the nebula was an easy object in the Lick telescope, while Struve's nebula, in the immediate neighbourhood, was absent, and the nebulosity round τ Tauri was imperceptible (NATURE, vol. lii. p. 180). Under the very best conditions of observation in September last, however, Hind's nebula seemed to have entirely vanished, although every means was tried to see it. This appears to definitely prove that the light of the nebula fluctuates, and it is therefore desirable that the place of this object should receive careful attention. τ Tauri was involved in a small hazy nebulosity, but the definite nebula in which it shone in 1890 did not exist four months ago.

o CETI.—The last two or three maxima of this well-known variable star have occurred considerably later than the computed times, and the present, or perhaps approaching, maximum is similarly behindhand. According to the ephemeris in the *Companion to the Observatory*, there should have been a maximum on December 9, but on January 8, the star had barely reached 4th magnitude. The star is now much more favourably situated for observation than during several preceding maxima; and, in view of the irregularity to which reference has been made, it is important that the magnitude should be recorded as frequently as possible. Spectroscopic observations will also be valuable, and it may not be out of place to suggest a special look-out for bright lines of helium and the associated gases, as well as observations of the varying relative brightness of the carbon fluting slightly more refrangible than the *b* group of magnesium.

STELLAR VELOCITIES WITH OBJECTIVE PRISM.—The great advantages of the objective prism over the slit spectroscope for photographing the spectra of stars have been abundantly demonstrated, but hitherto the latter form of instrument has been considered essential for precise determinations of velocities in the line of sight. An adaptation of the objective prism for the latter purpose is proposed by M. Deslandres (*Observatory*, January). In the arrangement suggested, the collimator of an ordinary spectroscope is placed in a direction perpendicular to the rays proceeding from the star, and the light passing through the slit from the comparison spark is reflected upon the objective prism by a small totally-reflecting prism. The collimator, objective prism, and photographic telescope, thus constitute a complete slit spectroscope. With the aid of the auxiliary visual telescope, the spectrum of the star is photographed with the objective prism in the ordinary way, and during the exposure the terrestrial spectrum is photographed nearly alongside that of the star, the adjustments having been so made that lines of equal refrangibility in the two spectra are in the same straight line. The spectrum of a star with which a comparison of velocity is desired, or may be that of the same star after an interval, is then photographed adjacent to the first, with the help of the visual telescope; and another terrestrial spectrum is photographed alongside the previous one, a different part of the